Ali Garjani

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Education

2021-2024 **EPFL (École Polytechnique Fédérale de Lausanne)**, *Switzerland*,
MSc. Computational Science and Engineering | GPA: **5.59/6**,
Master Thesis: Investigating Tokenization Techniques for Improving Multimodal Foundation Models

2017-2021 **Sharif University of Technology**, *Iran*,
BCs. Computer Engineering | GPA: **19.08/20 (Top 10%)** ,
Bachelor Thesis: Neural Distributed Image Compression using Common Information

Research Interests

- **Multimodal Learning:** Enhancing vision-based models by integrating multimodal data to improve scene perception and understanding.
- **Learning from Dynamic Data:** Utilizing temporal and spatial information from videos, multi-view, and 3D data to improve the robustness and the performance of models across diverse tasks.
- **World Modeling:** Training models to understand the physcis of the world through future-state predcition.

Publications & Preprints

• **4M-21: An Any-to-Any Vision Model for Tens of Tasks and Modalities**,
Roman Bachmann, Oğuzhan Fatih Kar*, David Mizrahi*,* **Ali Garjani**, *Mingfei Gao, David Griffiths, Jiaming Hu, Afshin Dehghan, Amir Zamir*,
– Neural Information Processing Systems (**Neurips**), 2024, [Website][Paper][GitHub][Demo]

• **Neural Distributed Image Compression with Cross-Attention Feature Alignment**,
Nitish Mital, Ezgi Özyılkan*,* **Ali Garjani***, *Deniz Gunduz*,
– Winter Conference on Applications of Computer Vision (**WACV**), 2023, [Paper][GitHub]

• **Neural Distributed Image Compression using Common Information**,
Nitish Mital, Ezgi Özyılkan*,* **Ali Garjani***, *Deniz Gunduz*,
– Data Compression Conference (**DCC**), 2022, [Paper][GitHub]

• **Forecasting Influenza Hemagglutinin Mutations Through the Lens of Anomaly Detection**,
Ali Garjani, *Atoosa Malemir Chegini, Mohammadreza Salehi, Alireza Tabibzadeh, Parastoo Yousefi, Mohammad Hossein Razizadeh, Moein Esghaei, Maryam Esghaei, Mohammad Hossein Rohban*,
– **Nature** - **Scientific Reports Journal**, 2023, [Paper][GitHub]

• **Importance of OCT-derived Biomarkers for the Recurrence of Central Serous Chorioretinopathy using Statistics and Predictive Modelling**,
Emilien Seiler, Léon Delachaux, Jennifer Cattaneo, **Ali Garjani**, *Alexia Duriez, Thibaud Martin, Jérémy Baffou, Sepehr Mousavi, Ilenia Meloni, Ciara Bergin, Mattia Tomasoni, Chiara M Eandi*,
– **Nature** - **Scientific Reports Journal**, 2024

* Equal contribution, randomized author order

Research Experience

2024 Mar - Nov **Research Intern at Visual Intelligence and Learning Lab**, *EPFL*,
Advised by Prof. Amir Zamir
- **Test Space Training:** Leading a project that utilizes self-supervised multimodal learning to specialize the model for a specific physical test space, enabling it to effectively perform unseen tasks in that space.
- **Multimodal Video Models:** Leading the development of a multimodal model to interpret video, text, and dynamic data, focusing on enhancing world modeling through multimodal training.
- **Understanding the Visual Capabilities of MLLMs**: Evaluating of multimodal large language models such as ChatGPT, Gemini, and Claude on well-known vision tasks and benchmarks.

2023 Feb - Dec **Research Lab Assistant at Visual Intelligence and Learning Lab**, *EPFL*,
Advised by Prof. Amir Zamir
- **Scaling Multimodal Foundation Models:** Scaling a multimodal multitask model to handle 21 diverse modalities, using discrete tokenization to unify representations and enhance training scalability.

2020-2021 **Research Intern at Information Processing and Communications Lab**, *Imperial College London*,
Advised by Prof. Deniz Gunduz
- **Neural Image Compression:** Designed an autoencoder architecture and formulated a loss function for efficient distributed neural image compression using side information.

Work Experience

2024 **Remote Research Intern and ML Engineer at Duranta**, *Seattle*,
Building 3D abstract models from 2D images and generative modeling.

2023-2024 **Research Lab Assistant and Intern at EPFL**, *Lausanne*,
Training and experimenting with multimodal foundation models.

2022 **Data Science Intern at Jules Gonin Eye Hospital**, *Lausanne*,
Trained a model to predict a disease recurrence in patients using their OCT scans.

2021 **Software Engineer at Wize Analytics**, *Tehran*,
Designed and implemented an automatic data engineering pipeline.

Teaching Experience

EPFL **AI Product Management, Image Processing II**
Participated as a mentor in exercise classes

Sharif University **Artificial Intelligence, Linear Algebra (Practical Head)**
Designed problems for exams and assignments, and mentored exercise classes

Specialized Skills

Machine Learning: Multimodal Learning, Self-Supervised Learning, Diffusion Models, Tokenization, Embodied-AI

Theory & Math: Numerical Partial Differential Equations, Complex Dynamical Systems Analysis, Information Theory

Technical Skills

AI Toolkits: AI2-Thor, Detectron2, Open-MMLab

Library: Pytorch, Tensorflow, Transformers, Ray Serve, Selenium

Software: Blender, Unreal Engine, Adobe

Frameworks: Git, Docker, Django, Android Studio, React Native

Programming Languegs: Python, C++, C, Java, Swift, R, Javascript, Matlab

Honors and Awards

- Ranked 126th in nation-wide Iranian Universities Entrance Examination among more than 148000 participants (2017).

Academic Service

Presentations: **EPFL AI Day**, *Presented 4M and ViPer to the public*

Reviewer: **CVPR 2025, ICLR 2025, AAAI 2025, CVPR 2024, DCC 2023**

Scientific Staff: **Sharif FieldIn, DataDays, Webelopers, AI Challenge**

Languages & Hobbies

Language: Persian (Native), English (Advanced), Azari (Fluent)

Sports: Bouldering, Tennis, Football, Volleyball

Art: Creative Coding